

Cement MILL SECTION of

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Fatal Accidents

Are They Due to Faulty Mechanical Equipment or
Appliances or to Carelessness or Both?
How Can We Prevent Them?

By R. FRAME

Alpha Portland Cement Company

After giving some thought to this subject following the receipt of the invitation from Mr. Jacobsen to prepare this paper, it occurred to me that I have been drawn as a grand jury of one to find an indictment of some sort against the cement industry. You may consider yourselves as the regular jury, and I hope through your discussions you will be enabled to reach a conscientious verdict as to where the guilt lies. From the best information that I can obtain there are no complete statistics available as to the grand total of lives lost in all industries each year throughout the United States. Whether the figure is 21,000 annually or 85,000, it makes little difference to us here today, for it is my opinion that we can safely proceed on the conclusion that whatever may be the exact number, it is much too high. The primary object of accident prevention work should be to save human lives. The reduction of other types of injuries is always to be commended, but we should not be prone to dismiss a fatal accident with the customary obituary, such as "I'm sorry for him—it was his own fault." Or, in case we know it could not be justly laid at the door of our dead comrade we reason—"He's dead now—nothing we can do will restore him to life—why stir things up at this time and likely bring about more trouble?" There are cases though where following a fatal accident a guard will be immediately put in place. Nobody seemed to realize the danger prior to the accident.

Since compensation laws have been in force many states publish accurate figures as to fatal accidents each year. When we read of men being killed as reported in the daily papers from different locations, it does not leave with us a very deep impression. Perhaps a few reports will help us to realize how much hard work there remains yet to be accomplished before we reach the front ranks in our safety battle. Nine years in Pennsylvania show 22,677 fatal accidents. It required \$19,000,000 to pay the cost of Workmen's Compensation in the state of

New York for the period of one year ending June 30, 1924. The cement industry, composed of plants in United States, Canada, Cuba, South America, etc., contribute generously to the state and national totals.

From the records published by the Portland Cement Association, and I regret to state that some plants did not report their fatalities in the early years of our tabulated experience, I find that the number of men killed in our plants represents the wiping out of one complete plant organization every six years. Suppose all fatalities could be confined to any one plant, what would be your opinion of your safety educational work, your bulletins, your supervision when you saw one-sixth of your men killed each year? The fact that in 1924 the 60 deaths were distributed among 53 plants should not make very much difference in our attitude to this important duty. As I see it we belong to a common family and every single death should cause us to pause, think about why it happened and then determine our personal duty to prevent a recurrence.

Mr. Jacobsen has presented a fine comparison of the experience of the plants by dividing them into groups representing 25% of the total plants. The first group is the only one which can show any material progress in the reduction of fatal accidents. The other plants continue to kill employees with marked regularity. In 1921 the first group killed 6.7 men for every 10,000,000 man hours worked. In 1924 they reduced them to 2.6 men. The record of the other plants is as follows:

1921, seven men; 1924, 8.4 men.

In 1913 the average record for 38 plants is 8.2 deaths and during 1924 the average record is 6.8 deaths. The credit of the reduction can, in my opinion, be awarded to the first 27 plants in the 1924 study. During the past six years only four plants have been free from fatal accidents. Since 1913, the cement industry has recorded 566 deaths; 146 of them are charged to the quarry and clay field. Granting that the men employed in this group will equal about 20% of the total plant force and that the

From a paper presented at the Fourteenth Annual Safety Congress, National Safety Council, Cleveland, Ohio, Sept. 29, 1925.

use of dynamite, haulage systems, weather conditions and rock slides increase the inherent hazards of this group beyond any one department of the plant, we may state that 25% of the deaths is not far out of line. Then come the crushing and raw departments which in combination contribute 107 deaths. As compared with the quarry there are far too many men killed in this branch of our operations.

Putting it another way if the clinker grinding department shows 50 deaths, the kiln room 41 deaths, the power house 20 deaths, with an average of 37, then the crushing and raw departments have no grounds to justify their 107 men killed.

Look at this grand performance of our coal grinding departments. Three men on a shift, a coal dryer, one or two grinding units, a department which handles about one-fourth the tonnage of either the raw, burning or finishing departments, whose hazards are well known and fully admitted—yet we turn in 59 deaths. Compared with the quarry record of 146, it would appear that we have identified culprit No. 2. The yard gang shows a record of 30 deaths. Here is where many new men begin their service, their work is scattered and varied. It would pay us to direct more efforts to safeguard these men. The causes of fatal accidents remain very much the same from year to year. Comparing 1913 with 1924, I shall quote just a few items. You should keep in mind that the man hours worked in 1913 are 50,000,000 and 1924, 88,000,000:

	1913	1924
Rolling stones in quarries and fall from face.....	3 fatalities	10 fatalities
Machinery.....	16 "	16 "
Smothered by slides of material in bins.....	7 "	5 "
Coal dust explosions.....	1 "	3 "
Electrocutions.....	2 "	3 "
Machinery being started.....	0 "	3 "
Balance.....	12 "	20 "
Total.....	41 "	60 "

If we are to reduce the fatal accidents, to me it seems essential that every plant organization should devote more time to study of death experience of the industry as a whole. In the period of 1923-1924 there was not more than one man killed at any one plant. If you have had no deaths or only one man killed in the space of two years, you do not have an opportunity to consider fatal accident hazards to any great extent. The study of accidents prepared by Mr. Jacobsen each year gives you accurate information, well prepared and better compared. Of course we are interested to learn how our plant stands and what our personal record may be. Perhaps we read every figure and every word in the bulletin. We note that so many men were killed and the brief explanation recited on each death. Then after a two or three hour study, do we lay the bulletin aside and give these deaths no more serious thought until next year's study is received? In the first eight months of this year 36 deaths have been registered. In past three years, the cement industry has taken husbands away from 127 widows and killed the fathers of 288 children who are all under 18 years of age. The remarkable features are that 10 men had been employed less than 30 days, while 16 men were employed for 10 years or more. One hundred and twenty-two English speaking men were killed as compared with 83 foreign, and it is safe to assume that approximately 40 of these could understand the instructions pertaining to their duties.

Upon reading over certain reports on the 205 deaths which have occurred from January 1, 1922, the following questions came up in my mind and then I listed them to see what answers we could offer. The particular accident quoted will help you to clearly understand the thought behind my selection.

How many deaths can be charged to the injured man himself? 39 deaths. —. Deceased was placed on siding to block clay car being switched. He placed block under car wheel but it did not grip. He then took his foot off the block and block fell inside the rail. He reached after the block with his right arm but did not get it. He again reached for the block and this time his right arm was caught between the wheel of car and the rail, the wheel passing over his right shoulder and across his back, killing him instantly.

How many deaths can we say are unavoidable and probably beyond immediate control? 24 deaths. —. Rock fell from quarry side, striking man on head. —. Man was drilling below bank when a hole the powder man was loading exploded prematurely, throwing rock on top of him. —. Explosion of dynamite that did not all explode when a shot was made two hours previous.

Are guards needed in some plants? 9 deaths. —. While deceased was cleaning the kiln chamber with an iron bar, apparently the bar fell in the screw conveyor and in endeavoring to pull the same out, the man fell into the conveyor. —. Caught in king gear of kominuter. —. Was caught between master gears of the coal dryer.

Do we need better supervision when we assign our workmen to work storage piles, bins, tanks, etc. 25 deaths. —. Evidently man went down the material bin and in trying to punch material loose, slipped into tunnel tap hole and in trying to catch himself, knocked shale loose which slightly covered him up, causing him to be smothered to death. —. Covered by slide in gypsum storage. —. No witness to accident. Man entered rock bin to dig down rock while rock was being drawn out through hoppers under bin. Rock passing out caused slide which covered him. —. Was removing sheet iron cover from grating of screw conveyor preparatory to filling same. Cement rushed over him. —. Deceased was shoveling stone in bin. He was wearing safety belt and rope. A slide took place, carrying deceased down with it. A second fall of material fell on him which broke the rope attached to the safety belt, thus causing him to be completely buried.

How many cases can you name where the workmen failed to heed a specific warning or to use safeguards provided by the plant management. 7 deaths. —. Was helping blasters. One hole failed to go off. Man was instructed by blaster not to connect broken wire with power line until switch was pulled out. Regardless of the instruction, he connected the wires, setting off the blast and was killed. —. Was standing on loading tracks. Another man on top of a car warned him that car would be moved. Brake was released and car set in motion when the man on the ground tried to get across and was caught between bumpers of cars.

Are high tension lines dangerous, are men killed by even low voltage and has the plant electrician an every day duty to follow up the condition of the apparatus? 15 deaths. —. Plastering walls of crusher building, he got too close to high voltage lines carrying 12,000 volts. —. Climbed on gable roof under high tension wire. Started down same way and came in contact with wire. —. Was adjusting electric light preparatory to entering tube mill. Electric light bulb was attached to an extension cord. It is claimed in making this adjustment, he received an electric shock resulting in death. —. Man broke an electric light bulb attached to an extension cord. He attempted to remove the broken part on the socket while standing in slurry and received a shock which killed him instantly. —. Had hung chain falls on wire rope cable, strung between trusses. Leaned forward evidently touching the wire rope with one hand and live 440

volt electric cable with other, and was killed instantly. —. While climbing from the top of crane bucket to the bottom flange of the crane girder, he accidentally grabbed or stepped on an electric wire.

How effective should we make our safeguards? 3 deaths. —. Man slipped and turned so that his foot and leg went into a screw conveyor. The construction of this screw conveyor is such that it was believed impossible for anyone to get into it. —. Was feeding coal to conveyor. Coal is fed through a hole into conveyor which has an iron grating over it and $\frac{1}{4}$ -in. steel bars across it, to let coal through. Man stepped on these bars and his foot went through in some way and he was struck by the conveyor a number of times.

Do we have auto deaths, too? 2 deaths. —. Deceased was sent on an errand and while on public street was run over and killed by a motor car.

There are miles of railroads on every hand which antedate our industry. How alert are our men? 12 deaths. —. Was cleaning track, working between rails when he was struck by rear end of empty rock trains. —. Run over by rock train. —. Crawled under skip cars which were being spotted for shovel, to protect himself from blast and cars passed over him. —. A cut of 7 empty cars coming down a $2\frac{1}{2}\%$ grade side swiped rear end of engine, resulting in the tearing out of four stud bolts which allowed steam and hot water to escape on men. —. Had thrown switch for dinky, engineer ran head on toward man, who missed step in trying to get on riding board, fell and dinky ran over him.

Did you ever follow your oilers? 3 deaths. —. While oiling was caught in chain and hurled around shaft. Killed instantly. —. While oiling in stone dryer, he leaned over line shaft and clothing caught and wound him around shaft.

Why jump into tank without some forethought? 3 deaths. —. Three men were cleaning out elevated water tank. Deceased heard calls for help and ran up ladder to top of tank. On arriving at top of tank, he saw men lying down overcome by gas. He was cautioned to put on rope but he would not wait for this to be done, saying that he had to get down inside to help the other men. He was overcome by gas.

You can't bet that surgical skill will always save your life. 1 death. —. Injured had thumb pinched between stone and chute while removing stone. Died from blood poison two weeks later, although he apparently received proper medical attention from the beginning.

Is Mr. Blood Poison always within easy call? 3 deaths. —. Deceased stepped on nail in board. He died from blood poison eight days later.

Why not teach our boys and girls to swim? 2 deaths. —. Three men were on a raft to inspect intake tower. Raft sank. Man was unable to swim and was drowned.

Do you use safety wrenches on coal cars? 1 death. —. While opening a car of coal, lever struck him on forehead.

Should we respect the smooth line shaft? I'll say he bristles with danger. 2 deaths. —. Was putting castor oil on a belt. To do this, he leaned over a running line shaft.

Can we make our scaffolds safe? 1 death. —. Injured was working on scaffold which was attached to deck of movable forms inside new sack house, when scaffolding broke, causing him to fall 42 ft. onto concrete floor.

Should you look for gears, pulleys and sheaves breaking away from confinement? 3 deaths. —. Elevator became blocked. The packed material was partly dug out and the elevator was then started. Man was at foot of elevator to

Death No. 24

Date: June 19, 1925. **Age** 18

Single. Italian

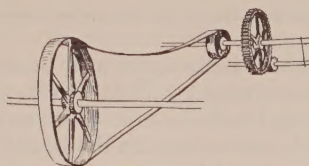
Employed Dec. 15, 1924

Occupation: Miller

Location: Masser Roll Room

Lights: Good

Cause—This employee evidently was applying belt dressing to a 2-inch feed belt to the masser rolls. He wore gloves. We think that he applied the belt dressing close to the pulley. His gloved hand was caught between the belt and pulley. His body was whirled around. One arm torn off. He was dead when found a few minutes afterwards.



Fifth Fatality

Caution—This employee had a good opportunity to put dressing on this belt at a safe distance from the pulleys. It is both foolish and dangerous for anyone to apply it to the pulley itself.

You must keep your hands at a safe distance from belts, pulleys, gears and chains when you work with your gloves on.

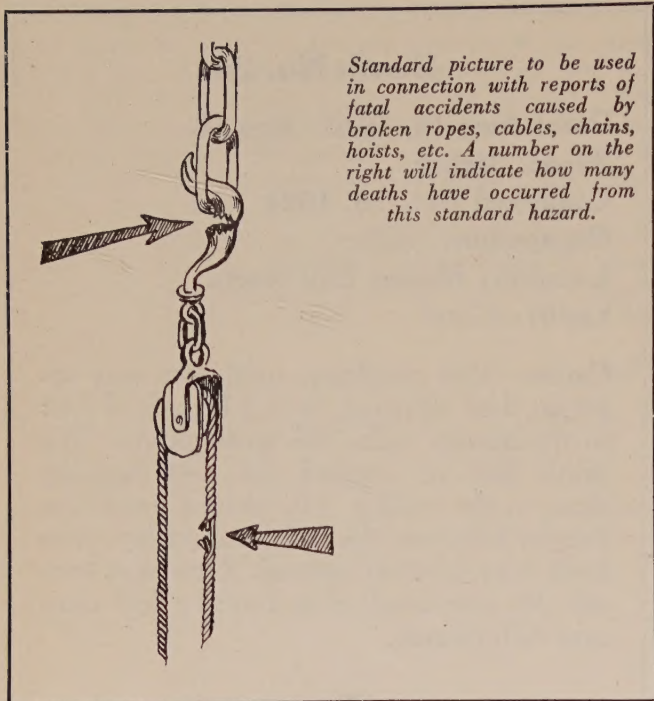
**Portland Cement Association.
116 Member Plants.**

Suggested form of bulletin for reporting fatal accidents

see if chain and buckets were on tracks. Main gear at head of elevator broke, striking him on head.

Do they always guess right. 2 deaths. —. Was over-seeing taking down staging. One man was tearing braces from staging while another was pushing against part nearest to deceased, expecting it to fall in opposite direction from them, but the first two pieces fell at right angles from building and last two fell parallel with building in direct line of deceased, hitting him on head and breaking his neck.

Where do they sleep? 2 deaths. —. Injured being temporarily idle owing to stoppage of mill, laid down on belt for a nap. Belt was started and he was carried under a discharge spout and crushed between the belt and spout. "Sept. 24, 1925. Franklin Demer, a well known young resident of Eagle Point, near Egypt, Lehigh county, was almost instantly killed Thursday, when he was struck by a dump car at the plant of the Whitall Cement Co., Cementon, where he was employed for several years. Demer, who was 31 years of age, died a short time after the accident from a fractured skull. Seeking a rest after



several hours of arduous labor, Demer placed a board between the rails of a narrow gauged railroad over which passes small electrically operated cars used in hauling stone to a grinding mill. He was asleep on the board, one end of which was perched on the bumper of a car. Unaware of Demer's perilous position another employee started the motor on the car, the bumper of which struck the sleeping man on the head, causing a multiple fracture of the skull."

How was this man killed? 1 death. —. Putting fasteners on belt, preparing to put belt in service. Owing to the late hour and being in a hurry to finish the job to get away on time, evidently did not use precaution.

Believing we should check up our performance with other major industries, I offer for your consideration the following comparison:

Portland cement industry, 1924. 88 million man hours worked.

Automotive Section—Auto and motor manufacturing

companies, auto part manufacturing companies, metal stamping and metalware companies, electric apparatus and appliances manufacturing, machine shops on small and light weight products: 1924—577 million man hours, 8 deaths.

Metal Section—Steel plant including blast furnaces, rolling mills, etc.; machine shop with foundries, bolt and nut manufacturing. Other minor divisions need not be mentioned here. Total—of all branches for 3 years—895 million man hours, 89 deaths.

Permit me to repeat that the Portland cement industry with the same exposure would have likely turned in 640 deaths.

Rubber Section—4 years—447 million man hours—23 deaths.

Profiting by the experience in other lines, I believe that before we can expect to secure 100% cooperation, every plant must be promptly and fully informed regarding the death accidents.

My suggestion is as follows:

1. Once each week the Portland Cement Association to mail to each plant a copy of immediate report of every fatal accident up to date.

2. The name of the company and the man's name not to appear in this special bulletin, but in its place should be substituted the number of the fatality and should carry a standard picture of hazard involved as can be applied to many accidents such as electric shock, gears, belts, dynamite, coal dust, locomotives, etc.

3. The size should be about three times the present immediate reports.

4. If so desired, member companies should be assigned the reports of death cases which occur in other member's plants with the request that they prepare the comments, so that we may in time gather better ideas of how various hazards are controlled in different parts of U. S. and elsewhere.

5. Accidents in 1924 cost the cement industry more than three-quarters of a million dollars, so that the cost of these death bulletins is rather insignificant.

6. Member plants to call each bulletin to attention of each foreman, then to members of plant safety committees and then posted on a special bulletin board to be kept neat and clean. It seems to me that it would be of considerable benefit to specialize in death publicity.

Safety Council Holds Interesting Meetings

Cement and Quarry Joint Meeting Develops Important Points of Interest to Every Producer

By D. F. JENNINGS

The meeting of the Cement Section of the National Safety Council in Cleveland, O., September 29, was characterized by the pioneers in safety work in the Cement Section as being the best ever held both in regard to the number in attendance and the interest displayed. There was a registered attendance at the opening of the meeting of 77 representatives of cement, lime and gypsum plants, and others interested in safety in these allied fields.

In his opening remarks Henry A. Reninger, special representative of the Lehigh Portland Cement Co., and chairman of the Cement Section, cited the growth of the section since 1920 when only two representatives of cement companies were present. The cement industry now has a larger percentage of plants belonging to the National Safety Council than any other industry in the country. At first it seemed a hopeless job to get the cement com-

panies to report accidents and to see the humanitarian side as well as the monetary side.

H. G. Jacobsen, secretary of the Cement Section and manager of the Bureau of Accident Prevention and Insurance, Portland Cement Association, reported that the bulletin committee which had started one year ago to work up bulletins to incorporate in the *National Safety News* was to be continued and the pictures bettered.

It was cited that the Cement Section had never had a membership committee, but that the work had been done by Chairman Reninger largely at Portland Cement Association meetings. Appreciation was expressed for the co-operation of Secretary Jacobsen, who has been in close touch with the industry.

Dr. R. H. Lansburgh, Section of Labor and Industry of Pennsylvania, commended the cement industry on its thorough organization for gathering statistics and reporting accidents which has created a very warm feeling between the cement industry and the State Labor Department. Pennsylvania was cited as having a great number of industrial accidents but one of the few states to have reductions in 1924. It has a bad record based upon the exposure—coal, steel and foundry industries all being hazardous.

The exposure and severity rate in the cement industry are known and this data is being shown to other industries. In this way the cement industry is doing a service to the State Department in helping to reduce accidents and promote safety. E. S. Chapin, Supervising Inspector for the Commonwealth of Pennsylvania, also praised the work of the Cement Section.

Elimination Possible

Mr. Jacobsen in speaking of the June No-Accident Month Campaign stated that it is possible, through concentration of efforts, to reduce accidents at a plant to practically nil, and possible to apply the same principles to the whole industry; a reduction of 66% in last June as compared with June, 1924, was reported and of 73% if compared with the average of the past few years. A campaign to demonstrate to plants not organized that it is absolutely possible to eliminate accidents has proved the possibility to a number of plant operators and as a result several plants have joined. No prizes were offered, but a certificate has been prepared to be sent to each plant having no accidents for June.

A healthy reduction of accidents and days lost for 1924 was reported and if it were not for a few plants the record would be very much better. The average figures at the bottom of the tabular report for the industry are reduced from year to year, but the reduction is not as great as is possible to attain. The danger of being too sure or too well satisfied with past records was emphasized as some of the older plants having good records are going backward or standing still. The 25 plants having the worst records and the 25 having the best records in 1919 have the same rating in 1924, the worst plants having gone ahead and the best ones stood still. The statement that it is not knowledge but training that is required is borne out by figures.

Spreading It Out

David Adams, Safety Engineer, Lawrence Portland Cement Co., in reporting a record of 75 days without a lost-time accident attributed the enthusiasm at his plant to the June No-Accident Month Campaign and expressed gratitude to the man who conceived of the campaign. R. Frame, Alpha Portland Cement Co., suggested extending the 1926 campaign to 90 days. This idea was also mentioned by

F. H. Sass, Universal Portland Cement Co., Buffington, Ind., who asked if any reaction had been noted after the No-Accident Month Campaign. Wm. H. Weitknecht, Lehigh Portland Cement Co., mentioned the importance of encouraging the "tail-enders," suggesting holding the campaign for one month with the idea of giving a preferred certificate where the no-accident record is extended to include more than one month. One company reported a reaction in July but "came back" in August, reducing its number of accidents 45% and lost-time 20%. Hugh H. Purkheiser reported that the No. 1 Mitchell plant of the Lehigh company had gone two years and one month without a time lost accident.

J. B. John, president of the Sandusky Cement Co., who has worked his way through every department of the cement industry, referred to the safety movement as one of the most wonderful of today and cited the necessity of the whole organization being convinced of the importance of safety work. One plant was mentioned which was doing good work and after a safety-first campaign began to lag. Investigation disclosed that the employees believed that the campaign was started through selfishness on the part of the company in an effort to avoid paying compensation. To illustrate the point that it is absolutely a matter of educating a workman to take care of himself one plant was referred to which was without fatal accident for 23 years. After some death traps were covered up there were more accidents. The cement company today is interested in the man himself and his work and the safety worker must have the welfare of the worker at heart to get him to understand safety work. If a man is careless he must be worked upon individually.

Equipment a Factor

Dr. F. Ritzman, Chief of Safety Service, International Labor Office, League of Nations, Switzerland, spoke of conditions in Europe, where not much has been done in safety work until the present time. He referred to the handling of materials by mechanical means as a factor in the reduction of accidents in America.

The papers "Fatal Accidents," by R. Frame, and "365 Days Without Accidents," by L. M. McDonald, will appear in more detail elsewhere in the Cement Mill Section of CONCRETE.

W. G. H. Cam, Canada Cement Co., referred to the "near accidents" not shown on the accident data sheet, and emphasized the necessity of using the imagination to anticipate accidents. Getting the whole history of accidents written up with a picture and the featuring of fatal accidents for the benefit of other plants was suggested. Some accidents have resulted from positions at the plants being obtained by patronage and not by regular employment methods accompanied by proper instructions.

David Adams enumerated requisites of safety work including proper supervision, definite instructions, education of general managers and presidents in safety work; foremen giving men history of accidents; belief in safety by the president of the company; foreman having humanity in his heart, being a good organizer and able to give orders and instruct men as to their duties; unbiased and open mind doing away with petty jealousy.

New Officers

The nominating committee named the following Cement Section candidates for office for the ensuing term who were unanimously elected: R. Frame, chairman; T. F. Halpin, vice-chairman; H. G. Jacobsen, secretary.

Companies represented at the meeting were: Alpha Portland Cement Co., Bessemer Limestone & Cement Co., Canada Cement Co., Ltd., Cayuga Operating Co., Clinch-

field Portland Cement Co., Giant Portland Cement Co., Glens Falls Portland Cement Co., Great Western Portland Cement Co., Lawrence Portland Cement Co., Lehigh Portland Cement Co., Louisville Cement Co., Manitowoc Portland Cement Co., Marquette Cement Mfg. Co., Missouri Portland Cement Co., Nazareth Portland Cement Co., Newago Portland Cement Co., Pennsylvania Portland Cement Co., Petoskey Portland Cement Co., Pittsburgh Plate Glass Co., Sandusky Cement Co., Tidewater Portland Cement Co., Universal Portland Cement Co., Consolidated Water Power & Paper Co., Woodville Lime Products Co., Electric Metallurgical Co. of Canada, National Carbon Co., Bates Valve Bag Co., Union Carbide Co., Baltimore & Ohio Railroad Co., United States Gypsum Co., Ocean Accident & Guarantee Corp., Employers Liability Assurance Corp., Mead Pulp & Paper Co., Industrial Accident Prevention Association, American Gypsum Co. and Portland Cement Association.

Cement and Quarry Joint Meeting

A joint meeting of the Cement Section with the Quarry Section, termed the baby section of the National Safety Council because of the fact that this was its first meeting, was held on September 30.

A paper on "Safety in the Use of High Explosives," by Lt.-Col. George R. Spalding, Corps of Engineers, was of particular interest in the quarry field and to the construction industry as well. It is presented practically in full elsewhere in this issue of CONCRETE. Colonel Spalding was in charge of construction of the Wilson Dam and has spent his life in construction work in the army. F. F. McLaughlin's paper on the same subject from the quarry man's viewpoint will appear in a later issue.

Discussion of the above papers stressed the importance of making the managing executive responsible for safety measures. A study must be made and the best explosives used regardless of cost. With the proper precautions accidents will be few—and in fact are few. It was suggested that a real living write-up giving details of the mistakes that have been made would be very beneficial.

The importance of connecting charges of explosives in parallel instead of in series was stressed. The blasting machine was stated to be not adapted to parallel or multiple connections. The use of detonators of one manufacture only in any one shot was recommended.

Springing holes was referred to as dangerous and no efficiency gained by it. The use of thermometers was

recommended to test the temperature of the hole before loading after springing. In loading black powder a funnel should be used reaching to the bottom of the hole.

"Hazards of Standard and Narrow Gauge Railroad Equipment in Quarries," by W. W. Stewart, sales manager, Koppel Industrial Car & Equipment Co., Pittsburgh, Pa., will be printed in full in this journal.

Quarry Section

The entering wedge of the Quarry Section was a meeting about three months previous to the Safety Congress when about 40 men in the gypsum and limestone rock industries got together and outlined a tentative program. It was pointed out that a lot of information aside from the dealing with the use of explosives—important kinks—will be made available through the National Safety Council and the National Crushed Stone Association.

E. E. Evans, chairman of the Quarry Section, cited that safety work as applied to quarry operation is peculiar to itself and that present quarry men are perhaps not alive to safety methods. It was pointed out that there is a dividend in the human side of safety work as well as in reduced maintenance costs of mechanical equipment.

T. P. Kearns, superintendent, Division of Safety Hygiene, Columbus, Ohio, cited that there is nothing to be gotten out of co-operation without putting something into it, but that safety will pay dividends in quarry operations. He referred to the present laws as inadequate because of progress made in the industry. New safety regulations are to be drafted and new health regulations made in the state of Ohio. He recommended a uniform standard for reporting accidents and circulating the reports through the plants. It was his opinion that mandatory law can not reduce accidents to a minimum without careful safety spirit and the necessary education in safety work. Points mentioned as important in the control of accidents were: safe angles to quarry faces; protection houses; carelessness; storage and use of explosives; crushers.

R. J. Davis, superintendent, U. S. Gypsum Co., Genoa, Ohio, read "How We Are Able to Operate With So Few Lost Time Accidents," and in conclusion stated that the real reason at his plant was because the men have grasped the real idea of safety. He repeated that when a group of men become interested in something and really want to put it across nothing can stop them.

E. E. Evans was elected chairman of the Quarry Section and D. C. Souder, vice-chairman for the ensuing term.

The Kiln Room

A Discussion by C. H. SONNTAG

The following discussion is explanatory or supplemental to Mr. Sonntag's original paper on some financial considerations of the kiln room which was published in the June and July issues of the Cement Mill Section of CONCRETE. One of the objects of the author was to stimulate careful study of factors affecting kiln room operations.

Rotary coolers have their supporters and,

on the other hand, some cement plant operators who are not using them are satisfied. Further statement on this subject from interested readers will be welcomed, and it is of minor importance whether or not the views expressed coincide with the discussions already published if the adoption or rejection in each particular case is based upon a careful study of the governing conditions.—Editor.

In a recent paper on certain financial conditions as affecting the kiln room of a cement plant I in several instances made use of specific figures to illustrate my argu-

ment, but stated repeatedly that these were used only to show the way in which the calculations were carried out, and were not to be taken as actual costs, outputs or con-

sumptions. The whole idea was not to say that a certain machine would save or lose so many dollars, or that another would use just a stated amount of coal under certain conditions, but to show a method of calculation only. It was quite clearly said that before these figures would be of any value in a given case, the calculations should be repeated by the engineer *using data derived from facts available from the design or operation of his own mill*. This means that if he can put in a rotary cooler, including everything that goes with it, for less money than I assumed, he should use that fact in his calculations. A rotary cooler may then prove to be either a good or bad investment, depending entirely on the circumstances of the case.

It is true that those who use rotary coolers and those who do not both seem to be satisfied. To me the reason is that their adoption or rejection has not been based on a careful study of the problem, and one of the stated objects of my paper was to stimulate such study.

I have had no personal experience as to the saving of fuel effected by the rotary cooler, and assumed none, basing my argument on data published by S. H. Harrison, and gave him credit for these figures. Since writing the original paper I have gone over the reports of the Conservation Committee of the Portland Cement Association, and find the following paragraph on page 103 of the minutes of the spring meeting of 1923. It is a part of the report of the Committee on the use of preheated air:

"These tests show that the Oregon company makes a saving by utilizing the preheated air when the clinker is cooled to about 600 degrees F. of 5 per cent of the fuel used for burning, which would mean that the saving is approximately from 7 to 8 per cent if the temperature of the clinker is reduced to 200 degrees F. This percentage is the gross saving, and when calculating the net saving that can be made by preheating air, there should be taken into consideration the interest and depreciation on the investment in the machinery required, the cost of the power required to drive the machinery, the repairs and operating labor for the same, and the fact that in many plants part of the preheated air naturally finds its way into the kiln without any effort to recover it."

It will be noted that the Committee gives the saving of fuel as a gross saving only, and lists a number of items of cost that should be charged against it. It appears also that the percentage of fuel saving at which they arrived by direct experiment is not far from that derived by Mr. Harrison some time previously. In fact, the difference is probably within the limits of experimental error.

In the past, 15 per cent has been considered a fair carrying charge on mechanical equipment in general, but the wear and tear on cement mill machinery is greater than in most other industries, and it seems to me that a correspondingly high overhead charge is justifiable. As to obsolescence, the development of new kinds of cement and new ways of making it should warn us that no man can tell what cement will be like or in what sort of plant it will be made ten years from now. The only safe way is to assess the obsolescence charge. Any other course is gambling with the future.

It is my personal opinion that the next great forward step in the technology of this industry will be the complete fusion of the raw materials in furnaces comparable in size and method of operation to the iron blast furnace. I am not referring to cements of special composition made for special purposes, but to the ordinary portland cement as we know it today.

The mortality among cement plants 15 or 20 years ago is a matter of history. One of the basic causes was that their executives did not realize, or at least did not make use of, the fact that it costs much money above the actual mill cost to put a barrel of cement on the market. While it may have been a subject of private discussion before that time, the matter was first given publicity about 1911 in a paper on overhead costs by an engineer who has since risen high in the industry.

There seems to be some question as to requiring plant equipment to earn a dividend beyond its mere overhead or carrying charge, which includes interest. It is difficult to understand this point of view. No thinking man will invest his money in a plant, tie up his funds and take the chance of business failure if his investment is to earn no more than if it were made in high-class securities listed on the Stock Exchange and readily saleable in case of need. A manufacturing enterprise is entitled to a higher rate of return, and this is what was meant by saying that a cooler should earn 15 per cent above its carrying charge. Perhaps the figure is too high. Perhaps a man may invest in an industry in the hope of getting a larger return than he could in conservative long-term securities and then, due to some unforeseen circumstances, may not get that return. That is the risk of industrial investment, and it is to offset that risk that such an investment should receive better compensation than if made in more secure and conservative lines. The real point to all this is that if the money spent for a cooler or any other machine is to earn no more than taxes, depreciation, obsolescence and the current rate of interest its investment in that way is not economically justifiable, for the risks of such an investment have not been properly cared for.

365 Days Without An Accident

By L. M. McDONALD

The important question of accident prevention as applied to industries has advanced so rapidly during the past few years, that it is essentially an asset or a liability on the balance sheet of any company, and in the eyes of the employee it is virtually a determining factor in his choice of occupation.

It is, without a doubt, a non-controversial subject and solicits whole-heartedly the closest co-operation between employer and employee. Executives have proven by their

manifold interest and concentrated support, that they are behind this great movement and the ultimate success of any undertaking which has the endorsement of the management of any company, must of necessity, depend on the subordinates of the company, on whom has been conferred the authority to govern, according to the ideals and principles of the company.

Conferring authority and responsibility upon capable men is the wisest and most far-reaching policy that can be adopted. Such selected men, entrusted with power, are sure to develop qualities which are invaluable to any

From a paper presented at the Fourteenth Annual Safety Congress of the National Safety Council, Cleveland, O., Sept. 29, 1925.

organization. They naturally respond to the confidence placed in them and serve the company with earnestness and devotion.

The latent capacity for initiative, ingenuity and accomplishment must have some opportunity to develop and expand, and in what better form can those inherent qualities of mankind be better directed than in accident prevention work, which is a service to his fellow men and loyalty to the ideals and standards established by his company.

Inspired by the above principles and encouraged by their application, we at Plant No. 8 of the Canada Cement Co. will attempt in our humble way to deal with the question of accident prevention as applied to our plant and the reasons for our success in operating the plant for 365 days without an accident, as the title of this paper indicates. Our experience and the efforts we have expended with various safety organizations, until we adopted the present permanent safety organization, namely, that the foreman to whom we look for efficiency and production, we also hold directly responsible for the general maintenance of their department; embracing cleanliness, guards, safe conduct and practice of all employees under their direct control and supervision.

To treat this subject intelligently, a brief resume of our work since we first became vitally interested in safety work is necessary. I realize that statistics are very uninteresting and for that reason reference will only be made to those covering yearly operations and then, only to cover the various safety organizations in effect during the respective periods.

During the year 1920, accident prevention work at our plant did not receive any special consideration; we had no active Safety organization and accidents apparently had to happen. At least, it was readily granted by all concerned, that it was impossible to prevent them. Our record for the year showed 44 accidents, including 2 fatalities and 924 days of lost time.

The early months of 1921 bid fair to place us in the category of a hazardous plant and occupation for with a toll of 41 accidents for the first five months, our head office entered the scene and politely informed us that we must take measures to cope with the alarming situation and institute some form of safety organization to reduce the number of accidents. Committees were formed in all departments and ways and means were discussed to counteract the deplorable record we had established and the low state of morale which existed throughout the plant. Although we failed to make June a no-accident month, we closed with a standing of 67 accidents and 948 days' lost time.

We disbanded the departmental committees and formed one general committee, composed of the foreman and three representatives from each department. We concluded that it was necessary to *teach* safety so the subject matter of our meetings dealt entirely with the question of education, and we can candidly say that this form of treating the subject was our first sincere attempt to grapple with the problem from a logical premises and lay the foundation for our future success.

Under our new policy we had our first no-accident month in February, 1922, and during that year successfully bridged four months clear of accidents and ended the year with 13 accidents, including 3 fatalities and 323 days of lost time.

In order to acquaint as many employees as possible with our educational propaganda, the personnel of our general committee was changed every three months, always retaining the departmental foreman as a permanent member. We here introduced a weekly plant paper which has been a medium of information and a messenger

of safety in our struggle to combat the evils of carelessness and insufficient knowledge and training.

April and June during 1923 were no accident months but a reaction set in in July which was indeed discouraging. After careful consideration we decided to reduce our safety committee to include only foremen, and thereby confer on the foremen the authority and responsibility for all future accident prevention work. We believe that men who are led to take responsibility go forward because they realize that they are expected to build up their part of the organization and for that reason more initiative and energy is expended on the work.

At our meetings which were really round-table talks, we discussed operating, mechanical, good-housekeeping



One of the departmental dials used at the plant of the Canada Cement Co. to tell the number of days since the last accident. This dial was used in the coal mill. The small figures at the bottom of the dial represent the check numbers of the men.

and general plant conditions. Cleanliness to my mind is the most important factor in a safety first campaign.

The past year with a clean plant and all foremen safety first enthusiasts and preachers, we closed with three accidents, including one fatality and 30 days' lost time. We successfully campaigned nine no-accident months and certainly proved that results can be obtained if knowledge, enthusiasm and loyalty are created and fostered.

After three years of steady persistent work in perfecting an organization for our safety work, we decided to aim at a very ambitious goal and attempt a no-accident year. All the foremen were enthusiastic and expressed confidence that this goal could be reached. We had our last accident on Sept. 25th, 1924, and we have passed successfully 365 days, with the honor flag which we raised at the first of the year still flying.

Now for a short resume of the main reasons for our success. We have a clean plant, an asset to any successful drive for safety work. We have a weekly paper, a medium of spreading safety information throughout the rank and file of the organization and keeping the important question of accident prevention ever to the fore. We have our departmental dials recording the number of days since our last accident and operated in some cases by the employee individually as his turn arrives. We sign all new employees in our First Aid Dept. and therefore introduce them to all rules and regulations covering the work and impress on them the necessity of attending to all cuts and bruises, even the most trivial.

We have our executives and foremen sold to the idea that accidents can and must be prevented and that their responsibility for efficiency and production does not cease at this point, but must include cleanliness, maintenance, installation of guards and accident prevention education

to all employees under their direct control and fullest co-operation in all matters pertaining to general plant safety.

If a foreman possesses the qualities of leadership, foresight and vision, he will organize his department and turn the work over to men qualified to bring about the performance of those duties, men whose success will be

judged solely by their accomplishments.

He will think and act of his own accord and with every thought and action comes the great ambition of every man to safeguard and protect the welfare of his fellow-man. When this spirit takes a hold, it is indeed contagious and success in any undertaking will eventually crown your efforts.

Large Blast Using Tunnel Method

When the Monolith Portland Cement Co. needed more limestone rock for its plant about 117 miles northeast of Los Angeles, Calif., the quarrymen proceeded to blast it from Limestone Mountain, close by the plant, in such a way that the rock would drop into the quarry. A charge of 70,000 pounds of dynamite was used and 200,000 tons of rock dislodged, states a local report.

A tunnel was bored 80 ft. into the side of the mountain. Then three cross tunnels were bored. The first was 30 ft. from the entrance and in it was loaded a charge of powder; the second was 40 ft. in and was loaded with a heavier charge; the third was 80 ft. in and was

loaded with a much heavier charge of dynamite. The entire cost of the dynamite used for one shot was \$20,000. Electric wires were laid and the switch was placed three-quarters of a mile away.

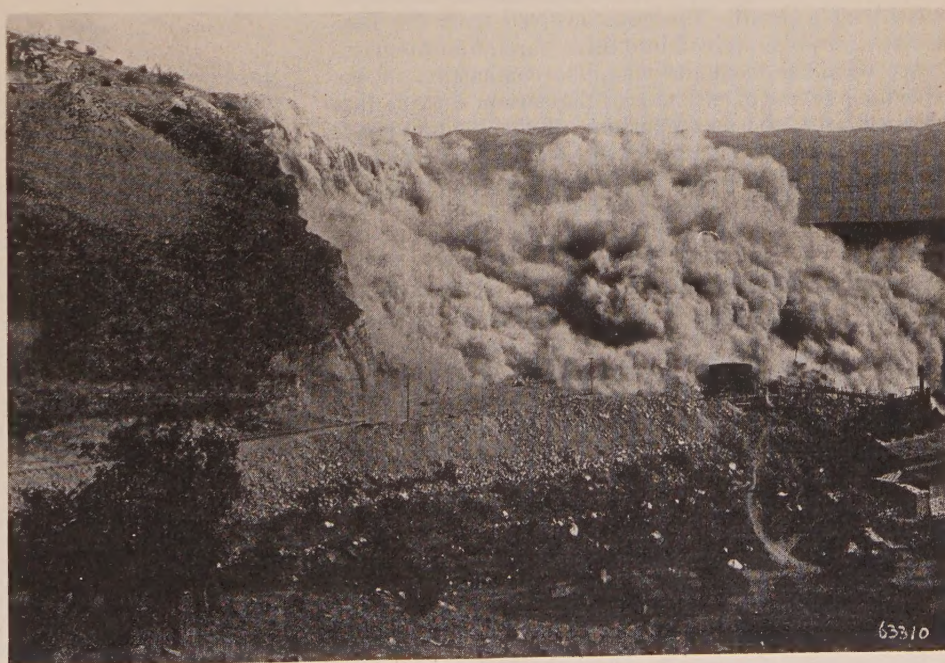
So scientifically was this tunneling done and the charges laid that when the switch was thrown and the sides of the mountain torn loose, the rock dropped to the quarry floor below, missing the first car track by 12 ft. and the second car track by only 6 ft. In just six minutes from the time of the explosion, shovels were on the scene loading the rock into cars for the crusher plant.



Fig. 1—Limestone Mountain before the blast. Car tracks are shown and the Monolith plant below on the right

Fig. 3—Limestone Mountain after the blast. View shows the rock as it fell near the car track

Fig. 2—The blast which tore 200,000 tons of rock from the mountain face



Technical Principles of Lime Burning Process

Abstracted from Article by Dr. G. Kappeler in *Zeitschrift Angewandte Chemie*,

In lime burning calcium carbonate is decomposed to give lime and carbon dioxide. The degree of decomposition is obtained from the following expression:

$$100 - \frac{A}{2.28(A-56)} \cdot 100$$
in which A is the number of parts of lime obtained from one hundred parts of pure limestone. These gravimetric relations are well known but the volumetric are not so well understood.

Burnt lime is more porous than the limestone, but the contraction that takes place in the lime burning process is only from 10 to 12%. The density of the burnt lime varies as the temperature. Thus lime burnt at moderate temperatures has a density of 3.08, that burnt at a higher temperature a density of 3.4, indicating that there are two forms of lime, calcium oxide, one which is less dense than the other and probably amorphous in character and the other crystalline occurring in cubic crystals, possessing a density of 3.4 and an index of refraction of 1.83. The first is stable at low temperatures and the second at high temperatures. The amorphous variety forms in the lime burning process, the change into the crystalline modification being very slow. As the density of the lime increases, indicating a larger conversion into the crystalline form, the speed of slaking is reduced.

The volume of the carbon dioxide evolved varies greatly according to the temperature at which the lime burning is carried out, a fact of practical importance often escaping the attention of the practical lime burner. The volume of gas evolved must take into consideration the amount of gas developed by the combustion of the fuel in order to be determined with accuracy. In the original article the calculations that are evolved in determining the amount of gaseous products evolved by the burning of the fuel as well as by the decomposition of the limestone are described in considerable detail. The gases evolved from the lime kiln may always be divided into three parts, first the gases that are obtained from the complete combustion of the fuel without excess of air, second the carbon dioxide that is obtained from the decomposition of the limestone and finally the excess air that is always present in practical operation of the lime kiln. A graphical representation is given in the original article.

Temperature

One important factor in the burning of lime is the temperature. The decomposition of calcium carbonate is not fixed at any one temperature, as may apply to a crystalline substance. The decomposition takes place over a wide temperature range. In order to understand clearly what takes place it is well to compare the decomposition of calcium carbonate to the evaporation of a liquid such as water. At any temperature in an enclosed system there is an equilibrium between water in the liquid phase and the water above it in the gaseous phase. In the same manner at any temperature there will be an equilibrium between calcium carbonate and lime and carbon dioxide.

The decomposition pressure of calcium carbonate is a very important property of the substance from the practical lime burning standpoint. The important point in the technical process is that at which the decomposition pres-

sure of calcium carbonate becomes equal to that of the atmosphere. This point is in the neighborhood of 900 degrees C. This simply means that at that temperature the limestone is literally in a sort of boiling status. At this temperature it is no longer necessary to remove the carbon dioxide with the aid of an air current or by diffusion processes. By the pressure which causes the carbon dioxide to evolve from the limestone, the air is caused to move aside through the inherent pressure of the gaseous carbon dioxide itself.

The decomposition of limestone takes place between temperatures of 775 and 830 degrees C. in the lime kilns, which operate on the countercurrent principle. It is also important to know the temperature at which after- or secondary decomposition takes place in the kiln through the action of air streaming through the incompletely burnt limestone. At this point a further evolution of carbon dioxide gas takes place. It is assumed that for this purpose a 3% concentration of carbon dioxide in the air is sufficient.

Experiments were carried out in an electric furnace to determine exactly what takes place at a temperature of 900 degrees C. The temperature within the furnace was made to increase from a certain definite starting point to that point. If no change took place in the system it would follow that the temperature would continue to increase from that point upward, but inasmuch as evolution of carbon dioxide gas ensues due to the decomposition of the limestone, a considerable amount of heat is absorbed in the decomposition process, just as heat is absorbed as latent heat of vaporization in the boiling of water. Thus the temperature can not rise any higher until all of the limestone has been decomposed. Thereafter the temperature rises.

The Burning Process

In the practical lime burning process the charge is loaded into the kiln at a low temperature, and then is gradually heated up by means of a current of gas which is drawn from the hotter layer of material in the kiln. Carbon dioxide in small amounts is evolved from the limestone at a temperature between 780 and 830 degrees C. When the temperature reaches 900 degrees C. the evolution of carbon dioxide is no longer dependent on the existing conditions, for the stream of gas is sufficient to overcome the atmospheric pressure. The outer layers of limestone, as soon as they are brought up to a temperature of 900 degrees C., yield their carbon dioxide content quite readily due to the transmission of heat from the flame or the combustion gases. On the other hand, the transmission of heat from the combustion gases to the particles of limestone which lie deep under the surface of the mass of carbonate depends on the rate at which heat is conducted by the substance. Hence decomposition of the interior mass of limestone takes place only so rapidly and to that measure in which heat is conducted from the exterior to the interior of the mass of rock. The rate of heat transmission is greater, the higher the temperature in the neighborhood of the limestone. Furthermore, this rate depends as well on the heat conductivity of the

layer of caustic lime that forms over the piece of partially burnt limestone. The exact character of this process is not understood. All that is known is that there are a series of zones set up in the piece of limestone according to the speed at which a temperature of 900 degrees C. is attained.

The larger the pieces of limestone that are burnt in the kiln, the higher the temperature must be in excess of 900 degrees C. at the surface. After-burning in the kiln, which is due to the heat that is contained in the pieces of limestone themselves, is possible only at those points which are but little removed from the true burning zone.

The presence of reducing agents in the limestone enhance the lime burning process. Thus when carbonate of lime is mixed with coal the temperature at which carbon dioxide gas is evolved is reduced to 800 degrees C. The presence of water vapor is also important in the practical lime burning process. It has been established that the presence of water vapor exerts a certain accelerating action on the lime burning process. The exact nature of the action of the water vapor is not clearly understood and much work remains to be done along these lines.

Physical Structures of Limestone

The presence of impurities in the limestones also has considerable influence on the practical lime burning process. The physical structure of the limestone is also of importance. Dense limestone, which is found in crystalline form, burns with difficulty and when large pieces of such limestone are being converted into quicklime it is often necessary to raise the temperature within the kiln to as high as 1,200 to 1,400 degrees C. As far as the impurities in the limestone are concerned, as long as they are the carbonates of iron, magnesia or manganese, no effect is noticed on the decomposition process. The same holds good for such impurities as clay and quartz, for the reason that these substances are inert and do not enter into the decomposition process. On the other hand, they reduce the sintering temperature of the limestone to a considerable degree. The presence of these impurities also has a bad effect on the slaking properties of the quicklime. They tend to give a lime which is similar in condition to "dead burnt" lime. Finally the lining of the kiln is an important matter and at the present time the tendency is to employ a lining material which contains a very high silica content.

A New and Important Explosive

Following many experiments both in the laboratory and in the field, the Hercules Powder Co. has announced a new high explosive—Hercules Special No. 3. It is especially designed for underground mining where fumes are important and it is adapted for underground work in ore, shale, clay, gypsum, and, because of its non-staining qualities, for use in salt mines.

Hercules Special No. 1 and Special No. 2 were two of the really important contributions of recent years to the blasting industries. Where these explosives are suitable a 15% reduction of blasting costs by their use is not uncommon, according to the manufacturers. They are most widely adapted to quarry and open-pit work.

The economy of Special No. 1 and Special No. 2 naturally appealed to underground miners, also. They are used successfully in some underground mines, but their fumes make them unsuitable for others.

The newly developed Hercules Special No. 3 has all the advantages of Special No. 2 and No. 2 with better fumes. It makes it possible to reduce costs underground to the same extent that Specials No. 1 and No. 2 reduce costs in the open.

Complete information on Hercules Special No. 3 can be obtained from any office of the Hercules Powder Co.

Bauxite in Dalmatia

By E. LEE HEIDENREICH

After several years of unfortunate experimentation, a Dalmatian company last year succeeded in interesting British capital, in the corporation Dalmatinski Bauxit, in Sibenik, Dalmatia, for the production and export of bauxite with a minimum capacity of 180,000 tons per year, of which in December last year alone was exported 21,000 tons. The analysis of this bauxite is as follows:

Loss by ignition	18 to 20%
Al ₂ O ₃	55%
Si O ₂	1 to 2%
Ti O ₂	3%
Fe ₂ O ₃	2%
Specific gravity of the ore.....	2.6

The bauxite is being shipped by steamer from the Sibenik harbor to the United States.

Canadian Lime Plant Destroyed

A disastrous fire that swept through the lime manufacturing plant of Randolph & Baker, Ltd., at Randolph, N. B., on the night of August 3, inflicted heavy loss. The fire was first seen at about nine o'clock and was not subdued until about one o'clock in the morning.

Because of the depression in building, these lime plants had been operated at only about one-third capacity since the opening of the current season early in April. When operating at capacity, the plants had a daily output of approximately 100 barrels of lime. The plants are located in the midst of the quarries, there being extensive deposits of lime rock in that section.

The Randolph & Baker lime plant is one of the oldest lime plants in existence. It has been operated for more than a century, having been established by the late Archibald FitzRandolph. The name of the settlement is derived from the latter's name. For more than 40 years, the plant had been operated under the firm name of Randolph & Baker, the partners being Archibald FitzRandolph and the late Charles F. Baker of Fairville. The business was continued under the management of Mr. Baker, following the death of the senior partner.

Repairs will be made, and new buildings constructed, but it is not yet known if the work of reconstruction will be started immediately. The loss was only partially covered by insurance. The firm's wharf from whence shipments of lime are made by schooner was undamaged. Directly across the river from the destroyed Randolph & Baker lime plants are the old established lime plants of Charles Miller & Sons, which were built amid extensive lime rock deposits over 50 years ago. These plants were undamaged by flying sparks and embers although the river is narrow at that point.

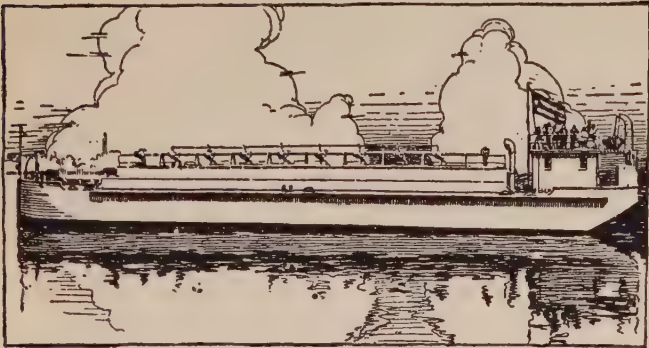
Missouri Pacific to Build Branch Line to Cement Plant

The Missouri Pacific R. R. has requested authority from the Interstate Commerce Commission to construct a branch line from a connection near Kincaid, Kansas, to the plant of the Great Western Portland Cement Co., at Mildred, now served only by the Missouri-Kansas-Texas Co. The projected line will provide the cement mill with a more adequate supply of cars in case of shortage and have the effect of reducing freight rates, as the entrance of the Missouri Pacific will result in one-line, and, in many cases, shorter hauls.

International Introduces New Method of Shipping Bulk Cement

Introducing important economies in the transportation of cement in bulk, the steel barge *El Morro*, which will be used to carry cement from the plant of the Cuban subsidiary of the International System at Muriel Bay to the company's warehouse in Havana, a distance of 25 miles, will shortly be placed in service, according to an announcement by the International Cement Corporation. The steel barge was built at Camden, N. J., and equipped at Norfolk, Va., where the Cuban vice-consul, Senor Munos, recently raised the flag of his country on one of the first vessels of its kind ever constructed.

Designed by the engineering department of the International Cement Corporation, *El Morro* is approximately 162 ft. long by about 34 ft. beam. Twenty large bins, ten on either side of the vessel, have a capacity equal to 5,000 barrels of cement.



The International Cement Corporation's new barge, "El Morro"

The cement is pumped into these bins from the storage supply at Muriel through a pipe 8 in. in diameter and 800 ft. long to the intake connection on the barge. Twenty outlets from the main distributing pipe lead to as many bins which are equipped with quick-closing devices to insure the proper loading.

When the barge reaches the docks of the Cuban Portland Cement Corporation's warehouses in Havana the cement is pumped from the barge to the top of the silo-type bins, which are about 80 ft. high. Unloading consumes about six hours, and it takes about the same time to load. This unique barge is thoroughly watertight and of massive construction, insuring the safe handling of cement under all conditions.

Asbestos in 1924

The production of asbestos in 1924, as reported by producers to the U. S. Bureau of Mines, Department of Commerce, amounted to 300 short tons, valued at \$42,526. These figures comprise 173 short tons of chrysotile asbestos, valued at \$33,941, mined in Arizona, California, and Montana, and 127 short tons of amphibole asbestos, valued at \$8,585 mined in Georgia and Maryland.

The imports of unmanufactured asbestos amounted to 183,250 short tons, valued at \$3,602,945.

Cement Retarders Being Investigated

There is a wide difference of opinion as to the adaptability of anhydrite as a substitute for gypsum as a retarder for portland cement. At present gypsum is commonly used for retarder in cement, on account of its cheapness, although it is known that plaster of Paris will retard cement, and that anhydrite has a retarding effect. The problem is of importance as many gypsum quarries are encountering anhydrite mixed with the gypsum in the deeper parts of the bed. In order to obtain definite information on the properties of anhydrite, gypsum and plaster of Paris, exhaustive tests have been conducted by chemists of the Bureau of Mines, Department of Commerce, with about 20 different portland cements, using pure anhydrite and mixtures of anhydrite with gypsum and plaster of Paris. It was found that pure anhydrite is a poor retarder, but some of its mixtures gave very good results. The best results as to setting qualities, strength, and plasticity, were obtained with mixtures of gypsum and plaster of Paris. Several fundamental principles governing cement retardation were established by the tests. This work was conducted by the Bureau of Mines in cooperation with and at the request of the cement and gypsum industries. The results are to be used as a basis for tests by the companies on a large scale.

Portland Cement Output in September, 1925

New September records were made on both production and shipments of portland cement during the month just closed, according to statistics compiled by the Bureau of Mines, Department of Commerce. Production has been exceeded only by that of August; shipments by two other months only. During the nine months ending September 30 the shipments amounted to 124,311,000 barrels, which exceeded the record volume moved in the corresponding period of 1924 by over 10%. Stocks of portland cement decreased but are over 21% greater than on September 30, 1924. The following tables, prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines, are based mainly on the reports of producers of portland cement. The September, 1925, totals include estimates for two plants.

Stocks of clinker, or unground cement, at the mills at the end of September, 1925, amounted to about 4,572,000 barrels compared with 5,640,000 barrels (revised) at the beginning of the month.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN THOUSANDS OF BARRELS

Month	—Production—		—Shipments—		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788	8,856	5,210	5,162	14,135	17,656
February	8,588	8,255	5,933	6,015	16,815	19,689
March	10,370	11,034	8,995	10,279	18,189	20,469
First quarter	27,746	28,145	20,138	21,456	—	—
April	11,726	13,807	12,771	14,394	17,159	19,877
May	13,777	15,503	14,551	16,735	16,403	18,440
June	13,538	15,387	15,036	17,501	14,903	16,409
Second quarter	39,041	44,697	42,358	48,630	—	—
July	14,029	15,641	16,614	18,131	12,319	13,896
August	15,128	16,419	16,855	18,383	10,666	(*) 11,952
September	14,519	15,939	16,827	17,711	8,404	10,180
Third quarter	43,676	47,999	50,296	54,225	—	—
October	14,820	—	17,160	—	6,073	—
November	13,141	—	10,289	—	8,928	—
December	10,435	—	5,506	—	13,913	—
Fourth quarter	38,396	—	32,955	—	—	—
	148,859	—	145,747	—	—	—

(*) Revised.

Imports and Exports*

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN AUGUST, 1925

Imported from	District into which imported	Bbls.	Value
Belgium	Massachusetts	29,103	\$63,391
	Philadelphia	29,793	43,053
	South Carolina	2,270	2,944
	Florida	69,976	120,588
	New Orleans	21,250	31,066
	Los Angeles	43,292	63,691
	San Francisco	3,003	4,025
Total		198,687	328,758
Canada	Maine and New Hampshire	1,001	1,631
	Vermont	14,995	22,019
	Saint Lawrence	25,188	38,972
	Rochester	1,918	2,116
	Buffalo	24,753	38,329
	Florida	14,697	22,072
	Washington	54	148
Total		82,606	125,287
Denmark	Porto Rico	30,240	46,857
France	New York	989	2,308
Germany	New Orleans	1,716	1,507
Japan	Hawaii	2,800	3,756
Norway	Maine and New Hampshire	4,015	6,376
	Massachusetts	27,523	49,200
	Oregon	11,915	18,792
	Washington	20,077	28,710
	Total	63,530	103,078
Grand total		380,568	611,551

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN AUGUST, 1925		
Exported to	Barrels	Value
Canada	1,147	\$4,867
Cuba	41,154	98,173
Other West Indies	10,455	26,413
Mexico	10,927	32,876
Central America	12,685	33,963
South America	24,132	75,359
Other countries	3,461	18,253
Total		103,961
		289,904

(*) Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision.

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN AUGUST, 1925(†)		
	Barrels	Value
Alaska	1,947	\$6,296
Hawaii	1,391	3,207
Porto Rico	8,000	18,030
Total		11,338
		27,533

(†) Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. Imports and exports in September, 1925, not available.

Cement Experts Meet at Bureau of Standards

An advisory committee of technical experts on portland cement, consisting of representatives of the United States Bureau of Standards, the Portland Cement Association and the American Society of Civil Engineers, met last month at the Bureau of Standards to review the work recently accomplished in the co-operative research now being undertaken by these groups.

Among the most noteworthy results reported at the present conference may be mentioned the exacting experimentation which has led to an acceptance of the findings of the Geophysical Laboratory of Washington on the exact chemical and physical nature of the primary compounds of portland cement. This view differs in some respects from that held by many European investigators. The American view, in general, holds that portland cement exists in the $\text{CaO} - \text{Al}_2\text{O}_3 - \text{SiO}_2$ system in the field $2\text{CaO}.\text{SiO}_2 - 3\text{CaO}.\text{SiO}_2 - 3\text{CaO}.\text{Al}_2\text{O}_3$, these compounds being the principal constituents of the cement, while some European writers believe that the compound $8\text{CaO}.\text{Al}_2\text{O}_3.2\text{SiO}_2$ is the principal hydraulic constituent. Others are convinced that there exists a solid solution of $\text{CaO} + 2\text{CaO}.\text{SiO}_2$.

Every effort is being made to concentrate on the fundamental problems of the constitution of portland cement

and the exact influence of each constituent. While studies on hydration and setting are under way, it is held important that these be not investigated exhaustively until reliable principles on constitution have been established. The studies on setting will then be made with the products of rigidly controlled composition. By this means, basic laws of composition and behavior in use should be established. For some time the work will be of more interest and use to the producer than to the consumer of cement.

The research staff consists of nine specialists in physical chemistry, petrography and engineering, who have been studying the fundamental problems of portland cement during the past fifteen months.

New Cement Merger

Merger of the Security Cement and Lime Co., with plants at Hagerstown, Md., and Beckley, W. Va., and the Helderberg Cement Co., with a plant at Howe Cave, near Albany, N. Y., through the formation of a new corporation to be known as the North American Cement Corporation, with assets of more than \$12,000,000, was announced in New York in August.

Frederick W. Kelley, for 25 years head of the Helderberg Co., will be president and Loring A. Cover, for 15 years president of the Security Cement & Lime Co., will be vice-president, Nicholas F. Brady and Robert C. Pruyan are among the directors.

Capitalization will consist of \$6,000,000 outstanding sinking fund gold debentures, series A, $6\frac{1}{2}$ per cent, with detachable stock purchase warrants; \$3,500,000 outstanding shares of 7 per cent cumulative preferred stock of \$100 par value; and 125,000 outstanding shares of no par value common stock. A large part will be given in payment for plants.

On October 13 the North American Cement Corporation took over all the property and assets, and assumed all contracts and closed up all unsettled business of the Security Cement and Lime Co., which it recently purchased.

While the business will be conducted under the new name there will be practically no change in management or policy. The North American Cement Corporation will be in even a better position than its predecessor to furnish its patrons with the highest class quality, service and general reliability, an announcement from the former officers of the Security company states.

The North American Cement Corporation has also purchased, subject to the approval of the Court, the property of the Tidewater Portland Cement Co. at Union Bridge, Md., and the assets in the hands of the receivers, Jesse N. Bowen and William J. O'Brien. The court order, dated Oct. 13, 1925, states that the sale of the property mentioned will be ratified and confirmed unless cause to the contrary is shown on or before Nov. 13, 1925. The report of the receivers states that the amount of sale is \$2,877,393.33, subject to the terms and conditions of the sale.

A notice to the bondholders, stockholders and creditors of the Tidewater company under date of Oct. 14, 1925, and signed by the receivers, states that on that date the receivers received an offer from B. T. Scott for the property and assets of the Tidewater Portland Cement Co., of \$2,980,000, a banker's check for \$50,000 accompanying the offer. This offer which was received subsequent to the offer of the North American Cement Corporation was reported to the Court by the receivers.

A report from Union Bridge states that the Tidewater plant, which is running to capacity, has been profitable for the past few years. With control of the Tidewater plant, the North American Cement Corporation will have control of all the cement plants in Maryland.

New Cement Projects in California

The probability of the founding of an important new industry which will mean a great deal for Calaveras County, California, is indicated in preliminary work and property transfers already completed. William McNider has been working for two years or more on plans for the financing and establishment of a cement plant at Kentucky House to utilize limestone deposits there and elsewhere in the county. These plans include a branch railroad from Valley Spring for which the original survey had to be changed on account of the Stockton flood control project on Calaveras River. A second survey for the railroad has recently been completed (May 1, 1925). Preliminary drilling and tests of the Kentucky House deposits have been finished, and plans for the plant are now being considered.

Late in March, 1925, Wm. McNider, Chas. P. Snyder, Geo. B. Poore, Lloyd Baldwin and Robt. Duncan deeded to the Calaveras Cement Co. several options and contracts, and parcels of land containing limestone deposits in the vicinity of Kentucky House, Cave City and on O'Neill Creek. William Wallace Means and other Easterners are reported to be interested in the new company, which has a staff at San Andreas in connection with the work.

The Yosemite Portland Cement Corporation

The Yosemite Portland Cement Corporation has the following officers: A. Emory Wishon, president; W. A. Sutherland, vice-president; Murray Bourne, secretary-treasurer.

This company owns a plant site of 145 acres located about two miles north of Merced, Calif., upon which they have a cement plant of 2,000-barrel capacity, about one-third completed. The plant has direct connections with the Southern Pacific and Yosemite Valley Railroads; the Santa Fe is preparing to build a spur track to the mill.

The plans call for a mill of reinforced concrete and steel construction, using the straight-line wet process. It will contain three kilns, already on the ground, 160 ft. long and 8 ft. in diameter. The finished cement is to be stored in six reinforced concrete silos, each 30 ft. in diameter and 90 ft. high, having a capacity of 90,000 barrels.

Electric power, furnished by the San Joaquin Light and Power Corporation, will be used throughout. Water will be obtained from deep wells on the plant site and from the Merced River at the quarry site at Jenkins Hill, Mariposa County. The corporation has acquired approximately 1,000 acres at the latter point containing immense deposits of high-grade limestone adjacent to the Yosemite Valley Railroad at an elevation of 1,340 ft. Large open face quarrying will be possible, with steam-shovel loading and spur-track transportation to the quarry crusher plant.

An innovation in the crushing department is the plan to reduce the rock from quarry-size to about $\frac{3}{4}$ -in. in one operation, using a Giant Williams mill of special design for the work. The distance from the quarries to the mill is approximately 63 miles.

The other principal raw material, clay, will be mined at the mill site, where extensive deposits of suitable clay have been developed.

When the Yosemite Portland Cement Corporation plant is completed there will be a total of eleven cement mills in California.

Limestone

The only known deposits of limestone of commercial importance in Ventura County, Calif., are beds outcropping in Matilija Canyon.

Joshua T. Stockton and J. A. Barry of Santa Paula are the owners of the Matilija group of claims. The outcrop of blue limestone along the top of the ridge north of Matilija Canyon strikes east and west for about one-half mile and is about 75 to 100 ft. thick. The rock is said to be an excellent natural cement, as yet undeveloped.

Ventura Cement Co. Deposit

This deposit is one mile above Vickers Hot Springs and 12 miles north of Ojai. Holdings comprise 500 acres of patented land.

The owner is the Ventura Cement Co., Frederic Hartman, president; Alfred Roth, vice-president; Frederic Sheldon, secretary, Ventura.

These deposits are undeveloped but of great potential value and large extent. The rock is stated to be an excellent natural cement. An analysis of this limestone has been made by the U. S. Testing Laboratory of St. Louis, and also by the Riverside Portland Cement Co.

ANALYSIS OF NATURAL CEMENT ROCK
Made by U. S. Testing Laboratory of St. Louis

	Per cent	Per cent
Silica	10.82	8.68
Alumina	4.34	3.20
Magnesia	1.66	1.27
Carbon dioxide	36.47	37.89
Lime	47.13	48.80
Totals	100.42	99.48

Duty-Free "Red" Cement Means Nothing

Cement may be imported from Russia duty-free, under a ruling by L. C. Andrews, assistant secretary of the treasury in charge of customs. In explanation Secretary Andrews stated that he had been advised by the Commerce Department that the Soviet Union of People's Commissars of Russia had issued a decree authorizing the Soviet customs to admit cement free of duty into Russia when shipped from a country which imposes no duty on cement imported from Russia. Paragraph 1543 of the Tariff Act of 1922 provides for the free entry of cement into the United States unless imported from a country imposing a duty upon cement imported from the United States. It was in accordance with this provision of the tariff law that the Treasury Department's ruling was issued.

Russia's action in giving free entry to cement from the United States is regarded merely as another gesture on the part of the Soviet to create sentiment in this country favorable to diplomatic recognition. A negligible amount of cement now is imported from Russia and it is doubted by the Commerce Department whether Russia ever will successfully participate in the export trade now being carried on by several Western European countries. American manufacturers export no cement to Russia and they are not interested in that field. It is apparent, therefore, that the Treasury Department's ruling placing Russian cement on the free list was promulgated merely to conform to the reciprocal provision of the tariff of 1922 concerning cement.

The Macdonald Engineering Co., 53 W. Jackson Blvd., Chicago, announce the establishment of an eastern division office, in a consolidation of interests with the Spencer Construction Company, Garrett Building, Baltimore, Maryland. The business of the eastern division office will be in charge of Mr. J. C. Carter, vice-president of the Spencer Construction Company.

Men and Mills

Notes from the Field

Foote Bros. Gear & Machine Co. have recently purchased equipment for the manufacture of the modern type of herringbone gears without the center groove.

The equipment is now installed and ready for operation and the company is in a position to produce "Backbone" Herringbone Gears, in all standard sizes.

The machine was purchased from the Farrel Foundry and Machine Co. of Buffalo. The gears are of the Sykes Generated Continuous Tooth type.

They will also produce a complete line of Herringbone Speed Reducers of the heavy-duty type, comprising single, double and triple reduction units up to 125 h.p. capacity and reduction ratios up to 120 to 1.

Additions to the plant of the Dixie Portland Cement Co., increasing the production of the mill to 8,000 barrels daily, entailing an expenditure of half a million dollars, were recently announced by Richard Hardy, president of the company, and mayor of Chattanooga. The projected development will, it is stated, place the Dixie company at the top of the list of cement producers in the southeast.

Work on the project will be completed by March 1, 1926. The plant of the Dixie Portland Cement Co. is located at Richard City, but general offices are in Chattanooga. At the present time the company is shipping approximately 40 cars daily, but with the addition completed, including the installation of two new kilns, the daily output will be increased to 50 cars every 24 hours.

The announcement is in keeping with the general plan of expansion carried out every year since the establishment of the company.

The Fourth National Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York, from November 30 through December 5, 1925.

The Power Show, as this exhibition is styled, is an important clearing house of information for the executives and engineers of all industries. In this it is different from the exhibitions devoted to the equipment of a single industry as power is a fundamental factor in every industry and a showing of the machines and apparatus required for its economical generation and use gives an opportunity to every industrial executive to discover some means of cutting his promotion costs.

The several portland cement plants in Alabama are operating to capacity and the shipment of the product is greater than the make at present, what little warehouse stock was left over from last winter having been removed. An immense amount is moving into Florida, according to J. W. Johnston, vice-president and manager of the Alabama Portland Cement Co., subsidiary of the International system.

As outdoor development in Florida continues the year round, shipments from the Birmingham district of cement, brick, structural and concrete reinforcing steel, etc., should remain steady.

More than a score of men were reported injured August 17 when a work train on which they were bound to the

Atlas Portland Cement Co. plant at Hasco, south of Hannibal, Mo., collided with a locomotive in the local Burlington railroad yards.

Thomas J. Flournoy, for 21 years president of the Southern States Portland Cement Co., and for 10 years president of the Farmers and Merchants' National Bank of Rockmart, died September 5.

Mr. Flournoy, for 25 or 30 years previous to his residence in Rockmart, was vice-president of the Paducah Water Co., which position he held at the time of his death.

Before coming to Rockmart in 1905, he was president of the Paducah Coal and Mining Co., of Paducah, Ky., and was connected with various street railways and lighting companies of that place.

At a cost estimated to be \$350,000, the Monolith Portland Cement Co. may in a short time abandon its present fuel system, which uses fuel oil, and install a natural gas fuel plant, obtaining the gas from a tap line on one of the main pipelines leading from Elk Hills to Los Angeles, according to a report received recently in Los Angeles. The project, if carried out, will involve the building of nearly fifty miles of pipeline.

Sale to private interests of all Philippine government owned operative properties was urged September 1 by Governor General Wood in a message to the Legislature on the grounds that the holdings show a deficiency in yearly operation, according to the *Rochester Herald*. The message points out that unless the holdings are sold to private interests the government will be compelled to appropriate further sums which are unavailable.

Government properties include the Manila Railroad, the Cebu Portland Cement Co., the National Coal Co., and other enterprises. The Governor General specifically requested that the Filipino National Bank be held under public control and not sold.

Workmen at the quarry of the Tidewater Portland Cement Co., Union Bridge, Md., have been engaged in drilling several tunnels into the rock preparatory to blasting rock for future raw material for the plant.

The City of Portland, Oregon, has decided to purchase its cement from Oregon producers at a price of \$3.00 per bbl. gross or \$2.55 net, which is 5c less per bbl. than that paid last year. Earlier bids were rejected when the local companies bid \$3.10 and foreign companies offered to furnish Belgian cement at \$2.70 gross. The domestic companies contended that the city should buy at home and support home payrolls, and pointed out that the foreign cement came in almost as ballast at a very low freight rate from countries where the cost of production was less than in Oregon.

A production of 1000 bbls. per day in excess of the estimate in 1921 was expected by the Monolith Portland Cement Co. officials with the completion of improvements and plant expansion started earlier in the season. A 4000-bbl. daily output was expected.

That more interest is being shown by business men in cement manufacturing methods has been evidenced by the recent inspection trips through cement plants in various parts of the country. Fifty-two members and guests of Business Men's Club of Kansas City, recently made an inspection trip through the Kansas Portland Cement Company's new plant near Bonner Springs. J. W. Le Haney, manager of the plant was host to the visitors.

Improvements under way at the plant of the Dixie Portland Cement Co., includes two new kilns, according to local reports.

A cement plant is contemplated on a site acquired along the Atlantic Coast Line R. R. in Florida, by Charles F. Kuhn, Cambridge, Mass., a report from La Belle, Florida, states.

The Atlas Portland Cement Co. is one of 14 American manufacturers to have merchandise or materials exhibited at the Palestine Near East Exhibition and fair at Tel Aviv. The American firms sent their merchandise through the Palestine Chamber of Commerce.

The Bath Portland Cement Co., Bath, Pa., formally passed into the hands of the Lehigh Portland Cement Co., Allentown, Pa., on September 15.

The Atlas Portland Cement Co. of Kansas, has moved its headquarters from Independence, Kansas, to Kansas City. The main office, according to a report from Kansas City, is at 608 Orear-Leslie Bldg.

The Marquette Cement Manufacturing Company's band and a party of officials of the company from La Salle, Ill., recently made a trip to Cape Girardeau, Mo., where the second Marquette plant is located. General Superintendent Moyle, Vice-President Bullard and Advertising Manager Wheeler and Sales Manager Payton were in the party.

The Ideal Cement Co. has begun the erection of a \$20,000 office building in the city of Fort Collins, Colorado. This is within a few miles of its \$2,000,000 cement mill up in the gas fields.

A partial shutdown at its plant near Pittsburgh has been ordered by the Universal Portland Cement Co. Over-expansion of the producing capacity of cement mills serving Western Pennsylvania, Ohio and West Virginia has made this move advisable, officials of the organization declare.

The Robert June Engineering Management Organization, Detroit, Mich., has acquired control of the Electric Flow Meter Co., Kansas City, Mo., formerly the Hyperbo-Electric Flow Meter Co. of Chicago, and will henceforth operate the business under its own management with executive offices at 8835 Linwood Ave., Detroit, Mich.

Robert June becomes president of the company, J. M. Naiman, formerly general manager, becomes vice-president, consulting and chief engineer with Major W. W. Burden of the Robert June Organization as treasurer.

The Electric Controller & Mfg. Co., Cleveland, Ohio, has appointed Eicher & Bratt, Seattle, as representatives for the sale of E. C. & M. control equipment in the states of Oregon, Washington, Alaska and the "Pan Handle" district of Idaho. In addition to handling this equipment, Eicher & Bratt also represent in their territory, the Pittsburgh Transformer Co., Jewell Electric Instrument Co. and the Electric Power Equipment Corporation.

The Petoskey Portland Cement Co., Petoskey, Mich., has recently doubled its productive capacity and is now producing Petoskey cement at the rate of six million sacks annually.

The International Cement Corporation has appointed H. C. Koch vice-president in charge of sales and publicity

for the domestic and foreign properties of the International System.

It is also announced by the International corporation that upon the completion of the Norfolk plant of the Virginia Portland Cement Corporation, Ejnar Posselt will assume the duties of vice-president in charge of operation and construction.

Mr. Koch has been general sales manager of International for several years, prior to which time he was in charge of the sales of the Texas Portland Cement Co. Before the formation of the International System, Mr. Koch had gained a broad experience in cement merchandising throughout the country.

Prior to taking charge of construction operations at Norfolk, Mr. Posselt was vice-president in charge of foreign subsidiaries in the International System. He is well known to the industry, having served in various technical capacities in this country for many years.

These appointments and assignments are in recognition of meritorious services which these men have given to the International System and in keeping with the expansion of that growing organization which recently acquired the Indiana and Alabama Portland Cement properties.

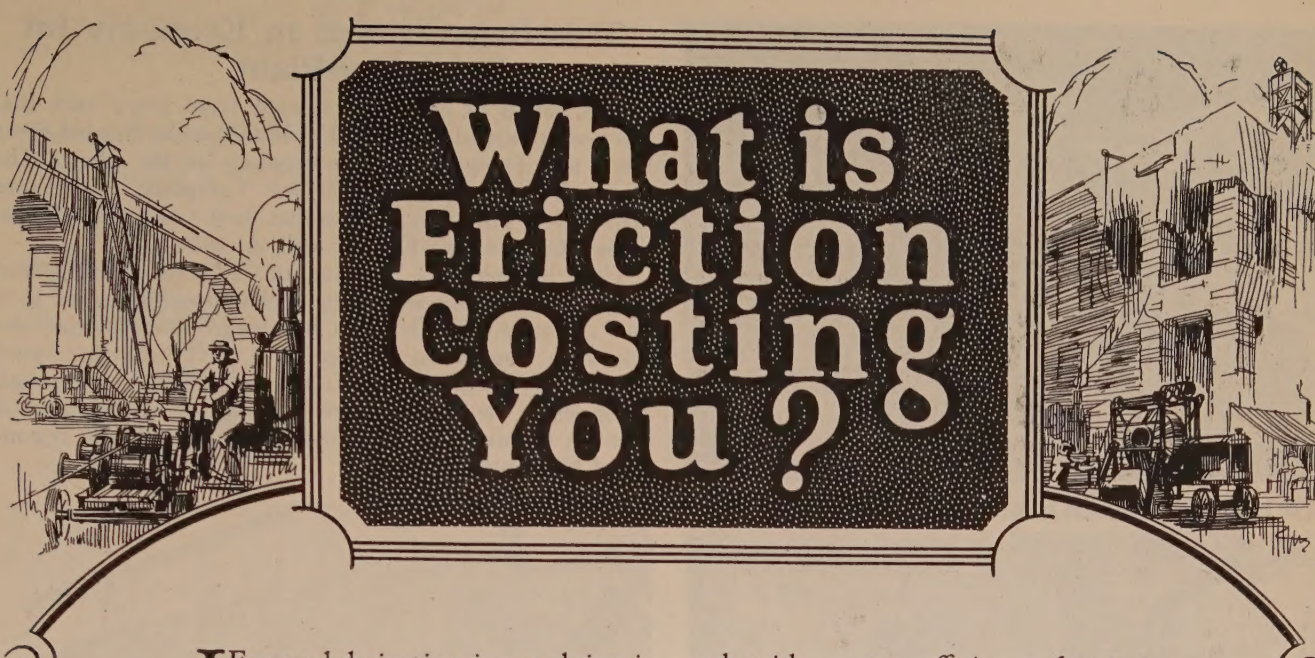
A contract to design and construct three concrete packing houses and a concrete bag house for the Edison Portland Cement Co. as an addition to its plant at New Village, has been awarded to the Public Service Production Co., of Newark, N. J. The packing houses will have a capacity of 10,000 bbls. of cement a day and the bag house, 240 ft. long and two stories high, will hold 2,000,000 bags.

The Robert W. Hunt Co., inspecting, testing and consulting engineers, with general offices at Chicago, Ill., announces the appointment of Fred M. Randlett as district manager of the Pacific Northwest territory. Mr. Randlett has been chief engineer of the water department of Portland, Ore., for the past eight years, during which time he had direct charge of the large and important addition to the water supply and distribution system of the city of Portland. Previous to that time he was engaged in the engineering department of the New York, New Haven & Hartford Ry. and Stone & Webster, Inc. Mr. Randlett will have his headquarters in both Portland, Ore., and Seattle, Wash.

Twenty frame and stucco dwellings are being constructed at Sandt's Eddy, Martin's Creek, Pa., as a part of the construction of the new plant of the Lehigh Portland Cement Company at that place. The construction is being done by the Public Service Production Corporation, which now has several hundred men working on the construction of the plant buildings. The twenty homes under construction are to be occupied by employees of the new plant. The new Martin's Creek plant should be ready for operation some time in September.

Plant safety measures are cutting down on accidents in cement plants, but things still happen at times. A few weeks ago an employee of an eastern plant was fatally injured, it is reported, when he fell into the screw conveyor leading from a kiln. A crew was busy handling the hot clinker in this conveyor, when one of the men slipped and fell into the spiral. Not only was he crushed by the spirals, but was severely burned by the material.

The accident might well suggest a method for the prevention of similar ones in the future. Ideas upon the subject would be welcomed by the editors.



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IF your lubrication is not doing its work with greatest efficiency, friction is taking excessive toll. It is causing not only considerable unnecessary loss of power, but rapid deterioration of your equipment as well.

Decrease the waste and damage attendant upon ordinary, unscientific lubrication and you will effect definite economies. You will decrease power loss, lengthen the life of your equipment, and save repair and replacement costs.

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Whether your lubrication problem is a large or small one, you will profit by calling in one of our lubricating engineers and getting his recommendations.

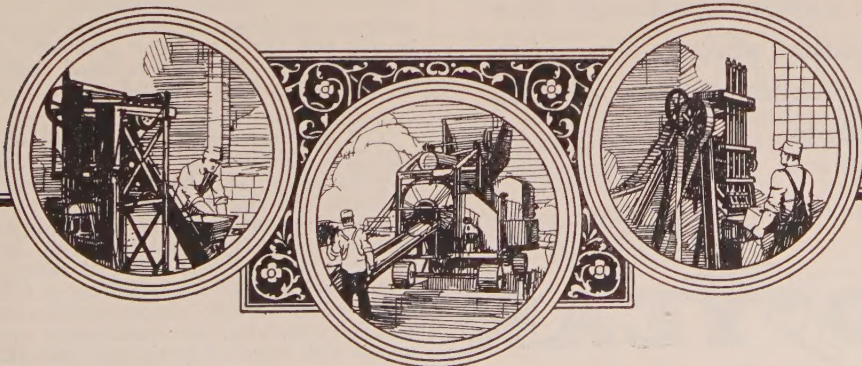
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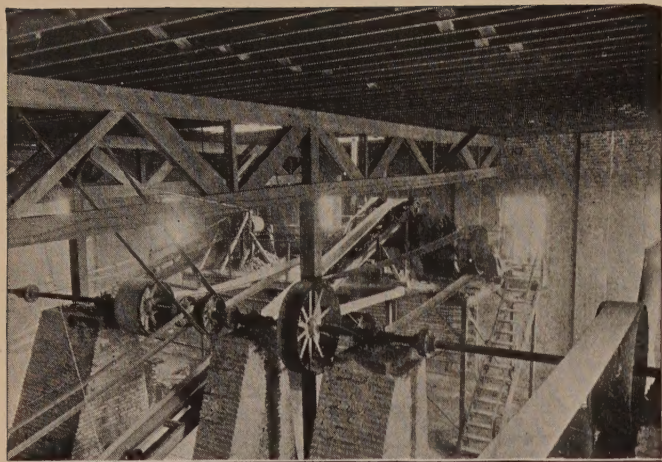
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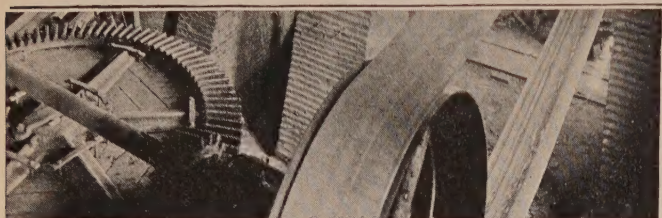
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Goodyear makes specially strong and abrasion-resisting belts for the cement industry—conveyor belts for the economical handling of rock, and efficient transmission belts for crusher, grinder, kiln, dryer and finisher drives, and for packing and loading machines.

These belts are designed and built to perform economically and efficiently under severe conditions of load, temperature and grit-laden atmosphere.

They are scientifically specified to your particular requirements by the Goodyear Plant Analysis method and the G. T. M.—Goodyear Technical Man.

Other Goodyear Mechanical Goods for this industry include steam, pneumatic tool, air drill, water, and fire or mill hose; asbestos, and rubber packings. For further information about them, write to Goodyear, Akron, Ohio, or Los Angeles, California.

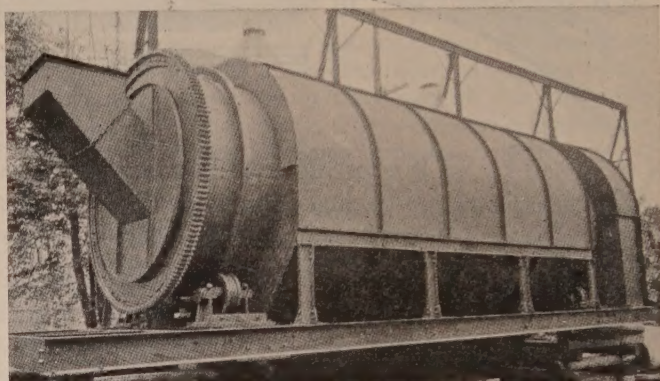
Goodyear Means Good Wear

GOODYEAR

This Bag Cleaner an Economy for Any Plant

One pound of cement reclaimed from every sack that has been returned, and 2,000 to 10,000 sacks cleaned every hour, will bring worthwhile economy to the plant. The Nazareth Foundry and Machine Company, 106 Front Street, New York City, claims that their Continuous Labor Saving Cement Bag Cleaner will do this.

Their cleaner is a combination of a revolving screen with lifters, within an air tight chamber, connected to a dust collector. The bags to be cleaned are fed into the revolving hopper by means of a belt conveyor, pass through the revolving drum, and are discharged through a hopper at the rear. The reclaimed cement is deposited in a bin running the full length of the screen, and is conveyed back into the system.



Here is one of the Nazareth Cement Sack Cleaners being delivered to one of the cement plants

As it requires seven minutes for the passage of a bag through the machine, split shipments can be separated by allowing a minute or two to elapse when feeding each consignment through the machine. This concern manufactures cleaners having capacities ranging from 2,000 to 10,000 sacks per hour, and arranged for either gear or chain drive. These cleaners have been installed, or are being installed, in four plants to date. The first cleaner has been in use for over a year, and all those installed, it is said, have proved to be saving of labor. It is claimed that they reduced the dust nuisance, reduced the cost of handling bags, reclaimed more cement, and have given cleaner bags than was possible for any other method.

Trade Publications

Footo IXL Speed Reducers is the title of an attractively illustrated book just published by Footo Bros. Gear & Machine Co., Chicago, Ill., as a new revised edition of that company's speed reducer book. Considerable new engineering information pertaining to the solution of problems involving spur and worm gear speed reducers is included.

The book is replete with illustrations, tables, formulae, practical problems and general information, of considerable interest to engineers and plant executives who have to deal with transmission gearing and speed reduction problems. It is 8½ by 11 in. and contains 80 pages. Numerous actual installations of speed reducers in cement plants are included.

"C-H Magnetic Clutches is the title of a new attractive sixteen page book published by The Cutler-Hammer Mfg. Co., of Milwaukee, Wisconsin. This book, which is known as Publication P-11, illustrates and describes many uses for these clutches on synchronous motor drives where the starting is severe, such as in cement, flour, paper and steel mill industries. It contains much working data and describes the principal features of the C-H Magnetic Clutch, which may be summed up as follows: Ease of operation, direct magnet action, smooth acceleration, no end thrust, fixed capacity, simplicity, low maintenance cost and the advantages of its use with standard synchronous motors.